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None

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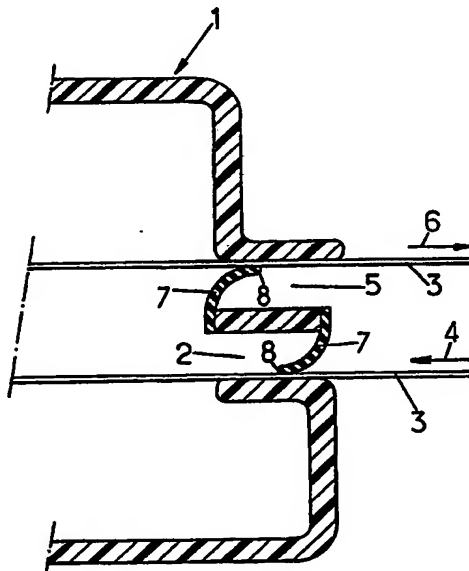
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Selected US specifications from IPC sub-class

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(54) Printing machine with reduced operating noise level

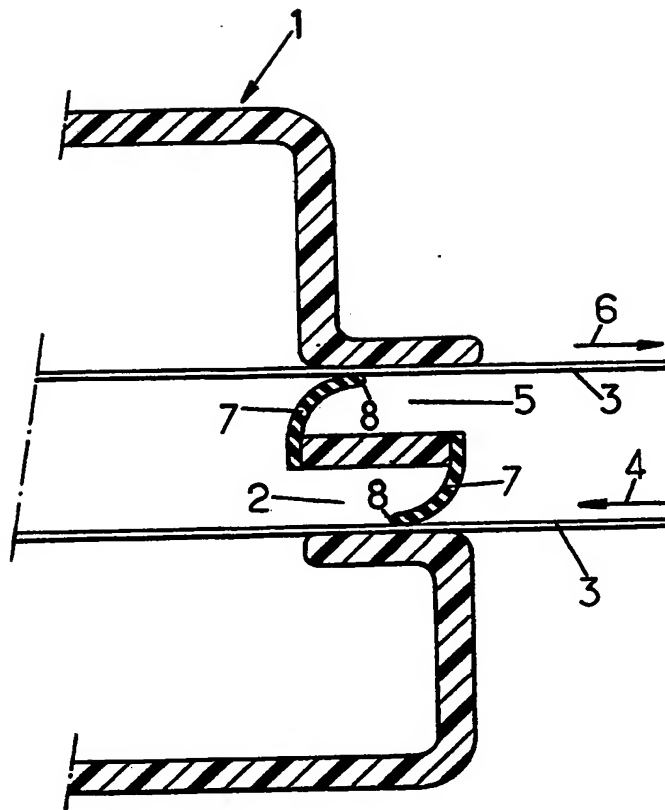
(57) A printing machine is arranged to print on a substrate (3) in sheet or in strip form and possesses a housing (1) having at least one inlet and/or outlet orifice (2,5) for said print support. The inlet and/or outlet orifice is provided with obturator means (7) constituted of a microporous cellular or alveolar flexible noise damping material, with a smooth abrasion resistant surface, and arranged to obturate at least the greater portion of said orifice and prevent the propagation outwards of the noises generated within the machine in the course of the operation of the latter without however interfering with the correct passage of the print support through the orifice.



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## Description of Invention

"Printing machine with reduced operating noise level"

5       The present invention relates to improvements in or to printing machines adapted to print a print support in sheet or strip form and possessing at least one inlet and/or outlet orifice for said print support, said improvements having the object of reducing the  
10       level of noise generated by the machine in the course of its operation.

15       The operating noises of a printing machine are essentially generated by the moving parts enclosed in the housing of the machine and they are transmitted to the outside through the operational openings with which the housing is provided. One at least of these openings is constituted by the outlet orifice or the inlet and outlet orifices provided in the housing for the passage of the print support.

20       To attempt to avoid this propagation of noise, it is known for the inlet and/or outlet orifice to be provided with obturator means constituted by an elastically deformable and noise-damping material and arranged to close at least the greater portion of said  
25       orifice and to prevent the propagation to the outside of the noises generated within the machine in the course of the operation of the latter without however interfering with the correct passage of the print support through the orifice.

30       However, this measure may result in defective operation of the machine by reason of the disturbance introduced by the obturator means, which are in contact

with the print support in the course of its procession during the operation of the machine. It is therefore necessary to choose the constituent material of said obturator means particularly carefully, so that the latter can ensure effectively their mechanical obturator function whilst permitting the print support to pass freely through the orifices concerned. In particular, experience shows that alveolar materials with large alveoles, which traditionally constitute good acoustic barriers, are not convenient for this specific application by reason of the friction that they exert on print supports of paper type being too high and which retards the advance of the latter.

It is therefore essentially an object of the invention to provide a technical solution which permits soundproofing mechanical obturators to be produced for the inlet and/or outlet orifices of the print support in a printing machine without resulting thereby in disturbance of the operation of the latter.

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To these ends, in a printing machine arranged to print a print support of sheet or of strip form and possessing at least one inlet and/or outlet orifice for said print support, this inlet and/or outlet orifice being provided with obturator means constituted of an elastically deformable and noise-damping material and arranged to close at least the major portion of said orifice and to prevent the propagation outwards of the noises generated within the machine in the course of the operation of the latter without however interfering with the correct passage of the print support (3) through the orifice, it is provided, according to the invention, for the constituent material of the absorber

means to be of a microporous alveolar flexible material, with a smooth surface and resistant to abrasion, possessing good vibration absorption properties.

5       Advantageously, the material used is a microporous alveolar foam, particularly a microporous polyurethane foam.

It can also be a microporous synthetic rubber.

10       The invention will be better understood on reading the detailed description which follows of a preferred embodiment given purely by way of non-limiting example and in which reference is made to the accompanying drawing in which the single Figure is a very diagrammatic view in cross-section, of a portion of a  
15       printing machine arranged according to the invention.

In the single Figure, only the portions of the machine necessary for comprehension of the invention are shown. In this Figure, it is seen that a portion of  
20       the housing 1 of the machine is provided, for example, with an inlet orifice 2 for the print support 3 which is still blank (arrow 4) and an outlet orifice 5 for the print support which has just been printed (arrow 6); the other units of the machine which have not to be  
25       taken into consideration here are not shown.

Each of the orifices 2 and 5 is provided with obturator means constituted by a flexible strip or flap 7 (in a single unit or in several sections arranged end to end) constituted by an elastically deformable and  
30       noise-damping flexible material. This apron is fixed so that its free edge 8 can rest freely, in use, against the print support 3 in the course of the passage through and it is curvable inwards in the

direction of passage of the print support. In a way, each apron constitutes an obturator flap with automatic positioning which closes at least the greater portion of said orifice and which prevents the propagation  
5 outwards of the noises generated within the machine in the course of the operation of the latter, without however interfering with the correct passage of the print support through the orifices 2 and 5.

Each apron 7 is constituted from a microporous  
10 flexible cellular material which possesses a smooth surface, guaranteeing minimal friction on the print support in passage therethrough ; which is resistant to abrasion, ensuring a respect for dimensions and of obturation quality throughout the lifespan of the  
15 aprons ; which possesses very good dimensional stability ; which possesses very high vibration absorbing power, guaranteeing effective sound insulation ; which resists chemical agents (cleaning products for the machines, inks) and ozone (due to the  
20 presence of electric motors).

For this purpose, there will advantageously be usable a microporous alveolar foam, such as a microporous polyurethane foam, or a microporous synthetic rubber.

25 The geometry of each flap and in particular its thickness, is selected so that it possesses sufficient stiffness to ensure effective isolation with respect to noise whilst having sufficient flexibility not to impede the appropriate advance of the print support.

30 Tests have shown that aprons having a thickness of some millimeters possess the required characteristics and procure a diminution of the noise of the order of several dB.

As is self- evident and as emerges besides already  
from the foregoing , the invention is no way limited to  
those of its types of application and embodiments which  
have been more especially envisaged ; it encompasses,  
5 thereof , on the contrary, all modifications.

CLAIMS

1. Printing machine arranged to print a print support in sheet or in strip form and possessing at least one inlet and/or outlet orifice for said print support, said inlet and/or outlet orifice being  
5 provided with obturator means constituted by an elastically deformable and noise damping material and arranged to obturate at least the greater of said orifice and to prevent the propagation outwards of the  
10 noise generated within the machine in the course of the operation of the latter without however interfering with the correct passage of the print support through the orifice, wherein the constituent material of the absorber means is a microporous alveolar flexible  
15 material, with a smooth surface, resistant to abrasion and possessing very good vibration -absorbing properties.

2. Printing machine according to Claim 1, wherein  
20 the material is a microporous foam.

3. Printing machine according to Claim 2, wherein the material is a microporous polyurethane foam.

25 4. Printing machine according to Claim 1, wherein the material is a microporous synthetic rubber.

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5. Printing machine according to any one of  
Claims 1 to 4, wherein the obturator means comprise at  
least one pliant strip or apron of flexible material,  
this apron being fixed so that its free edge can rest  
5 freely, in use, on the print support, in the course of  
passage there-through and being curvable inwards in  
the direction of passage of the print support.

6. Printing machine substantially as herein-  
10 before described with reference to the accompanying  
drawings.

7. Any novel feature or combination of  
features described herein.

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